SECTION 3

Alternatives

3.1 Introduction

This section describes the project alternatives and the processes used to develop, evaluate, screen, and refine them. The material in this section is structured to provide an understanding of the process that began with the consideration of many alternatives, through the selection and evaluation of two finalist build roadway alternatives and a package of supporting transit, TSM, TDM, and bike and pedestrian improvements that are common to both. Figure 3-1 illustrates the overall alternatives development and evaluation process. A comprehensive discussion of the overall process is documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

This section begins with a discussion of how the alternatives development process got started, including a description of the No-Action Alternative (Baseline). This discussion is followed by a description of the recommended transit improvements and a discussion of the process for developing, screening, and evaluating the roadway alternatives and their supporting improvements (in addition to transit), including TSM, TDM, and bike and pedestrian facilities. This section concludes with a comparative evaluation of transportation performance factors for the finalist roadway build alternatives.

3.2 Background

The alternatives development process began with a comprehensive review of the existing transportation system *Transportation System Performance Report* (LCTIP 1999). The review identified growth characteristics, travel patterns, trip characteristics, and the relative severity of the congestion problems. The principal conclusion drawn from this analysis was that congestion was expected to affect most of Lake County's roadways by 2020. The LCTIP recognized that this project would not be able to address all of the transportation problems, and resolved to focus on the major system deficiencies in the county and provide a foundation for future transportation planning by other agencies.

The transportation alternatives for this project are a combination of roadway, bus, rail, and other transportation strategies. Initially, the various modes were evaluated or considered separately and then combined toward the end of the process to create complete alternatives. The LCTIP alternatives development process employed a rigorous approach for developing and evaluating the roadway alternatives. The process used a state-of-the-art computer-aided approach, supported by regionally endorsed travel, population, and employment information provided by the Chicago Area Transportation Study (CATS) and NIPC. The computer-aided approach used task-specific software packages (TP+ and VIPER) to perform the necessary work.[1] These packages were selected because of their advanced features such as large-system capability, graphical interface, and use by a number of major metropolitan planning organizations in the United States.

3.3 No-Action Alternative (Baseline)

The alternatives development process commenced with the development of a No-Action Alternative (Baseline), consisting of transportation improvements that are anticipated to be constructed by 2020 regardless of the recommendations made by

[1] TP+ and VIPER Software are companion software packages. Released in 1997, it has powerful computational features for matrix operations, multi-modal network representation and assignments processes, combined with flexible file formats, graphical analysis, and presentation tools.

the LCTIP. The development of the No-Action Alternative (Baseline) required extensive coordination with the region's transportation service providers to gather information on funded or anticipated transportation improvements in the study area. The 1998-2002 Transportation Improvement Program (TIP), with 48 km (30 mi) of funded improvements, was the foundation for developing the No-Action Alternative (Baseline).[2] Recognizing that additional projects would be funded beyond 2002, an additional 71 km (44 mi) of existing road improvement projects were identified through coordination with transportation providers, bringing the total to 119 km (74 mi) of lane additions to existing roadways. In addition, routine repairs and operational improvements would continue for the existing roadway system. The No-Action Alternative (Baseline) also assumes that the transportation improvements identified in the 2020 RTP Build would be in place for those parts of the region outside the LCTIP study area.

In addition to the roadway improvements, the No-Action Alternative (Baseline) includes transit improvements consisting of the full build out of the NCS commuter rail line (52 commuter trains per day), five new Metra stations, and express bus service on selected corridors.[3] The transportation improvements for the No-Action Alternative (Baseline) are shown in Figure 3-2, and listed in Table 3-1 (on the following page) and Table 3-2 (on page 3-4). For this study, the No-Action Alternative (Baseline) is considered either a stand-alone alternative or common to the roadway (Build) Alternatives.

A population and employment forecast was developed by the project team for the No-Action Alternative (Baseline). The methodology for the No-Action population and employment forecast (year 2020) was endorsed by the NIPC and is documented in a detailed report prepared by the project team (ACG 2001, Appendix B). The methodology assigns mobility and accessibility factors to areas based on the availability of transportation facilities. Improvements in transportation facilities could enhance accessibility, having the potential to effect the future population and employment in a specific area. The No-Action forecast is based upon the differences in accessibility and mobility that would be provided by the No-Action improvements compared to the CATS 2020 RTP Build scenario (CATS 1998). The analysis results indicate that the No-Action improvements would increase population in Lake County by 31,000 new residents and employment would remain essentially unchanged (Figure 3-3).

Travel forecasts for 2020 were then developed by CATS for the No-Action Alternative (Baseline) based on the population and employment. These travel forecasts were used as a platform for developing and evaluating the initial alternatives.

3.4 Supporting Transportation Improvements

A number of modal options were considered during the study of transportation improvements, including improvements to bus and rail transit, TSM and TDM strategies, and bike and pedestrian facilities. An examination of these transportation options shows that they play an important role in reducing single-occupancy vehicles. The widespread congestion in Lake County, however, cannot be satisfied by these types of improvements alone. Presently, work trips by transit and pedestrian/bike account for less than 10 percent of all trips. The application of TSM and TDM strategies are benefiting travel efficiency, but on a very limited basis. The scale of population and employment growth in

[2] The latest TIP was released in November of 2000, however the 1998-2002 TIP was the best available information at the time the No-Action Alternative (Baseline) was developed. The Baseline projects have remained consistent with subsequent TIPs; they have also provided funding for several of the identified projects, bringing the total to nearly 50 miles of committed improvements.

[3] Three stations are located in Lake County; two others are located within the transit ridership influence area of the study area.

Lake County over the next 20 years is considerable, and based upon commuting characteristics, transit and system management practices by themselves are not capable of satisfying the projected transportation needs foreseen in Lake County. Despite the need for major transportation investment in the county's roadway system, these other

TABLE 3-1
Road Projects in the No-Action Alternative

Road	Improvements	Limits	Comments
US 45	Add lanes	Washington St. to IL 176	1998–2002 TIP
I-94	Add lanes	Lake Cook Rd. to IL 22	1998–2002 TIP
	Add on ramp	At Lake Cook Rd. (NB)	1998–2002 TIP
Pulaski Rd.	New extension	O'Plaine Rd. to IL 43	1998–2002 TIP
Midlothian Rd.	New extension	Peterson Rd. to Harris Rd.	1998–2002 TIP
Weiland Rd.	New extension	Aptakisic Rd. to Prairie Rd.	1998–2002 TIP
MLK Dr.	Add lanes	US 41 to Hillcrest Ave.	1998–2002 TIP
	Add lanes and resurface	Hillcrest Ave. to IL 131	1998–2002 TIP
Bradley Rd.	New extension	IL 176 to IL 43	1998–2002 TIP
Buffalo Grove Rd.	Add lanes	IL 83 to IL 22	1998–2002 TIP
Peterson Rd.	Add lanes	IL 60 to IL 83	1998–2002 TIP
	New alignment/ add lanes	IL 83 to Midlothian Rd.	1998–2002 TIP
	Add lanes	Midlothian Rd. to US 45	1998–2002 TIP
Hunt Club Rd.	Add lanes	IL 120 to Washington St. (A22)	1998–2002 TIP
Rollins Rd.	New extension	US 45 to IL 132	1998–2002 TIP
Butterfield Rd.	Add lanes	Allanson Rd. to US 45	1998–2002 TIP
Sunset Ave.	Add lanes	Delany Rd. to IL 131	1998–2002 TIP
Quentin Rd.	Add lanes	Lake Cook Rd. to Baldwin Rd.	1998–2002 TIP
Lake Cook Rd.	Add lanes	Weiland Rd. to I-94	1998–2002 TIP
IL 22	Add lanes	US 41 to IL 83	2001–2005 TIP
	Add lanes	IL 83 to Quentin Rd.	Identified by IDOT
	Add lanes (new alignment bypass around Lake Zurich)	Quentin Rd. to US 14	2001–2005 TIP
IL 21	Add lanes	IL 120 to Washington Street	2001-2005 TIP
	Add lanes	IL 120 to IL 137	Identified by IDOT
IL 83/IL 60	Add lanes	IL 176 to EJ&E	Identified by IDOT
I-94	Add lanes	IL 22 to IL 60	Identified by ISTHA
Rollins Rd.	Add lanes	IL 83 to US 45	Identified by LCDOT
Butterfield Rd.	Add lanes	IL 176 to IL 137	Identified by LCDOT
Busch Rd.	Add lanes	IL 83 to Weiland Rd.	Identified by LCDOT
Quentin Rd.	Add lanes	Lake Cook Rd. to IL 22	Identified by LCDOT
Washington St.	Add lanes	Lake Street to I-94	Identified by LCDOT
	Add on/off ramps	Full access control interchange at I-94	Identified by LCDOT

transportation improvements have an important role in the total transportation solution for Lake County. The proposed improvements described below for rail and bus transit are the product of considerable study and would supplement or be common to the roadway build alternatives. Other supporting improvements (TSM, TDM, bike, and pedestrian) will be described in Section 3.6.2, *Supporting Improvements*, in conjunction with the roadway build alternatives.

3.4.1 Rail and Bus Transit

The LCTIP identified the following objectives to guide the development of the transit improvements:

- Include transit as part of the solution.
- Improve access to and distribution from the fixed route system.
- Maintain and, if possible, increase transit's market share.

The process of forming candidate transit improvements began with a comprehensive inventory of the existing facilities, services, and usage (LCTIP 1999). This review was followed by an analysis of the trends and capacity of the existing system, then a review of the plans, proposals, other studies, and forecasts generated by the various planning agencies and transit system operators in the study area. Future population and employment were used to identify potential transit improvements beyond those in current agency plans. LCTIP developed the initial range of transit improvements to be considered. From this point, the initial proposals were refined, demand/ridership projections were developed, and cost estimates were prepared. A detailed discussion of this process is documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

3.4.1.1 Rail

A number of candidate rail service improvements were identified from existing plans, pending proposals, and input provided by the transit agencies. The final rail improvements that emerged from the study of these proposals are shown on Figure 3-4, and are listed below:

TABLE 3-2

Transit Projects in the No-Action Alternative

Project	Improvements	Comments
Metra		
North Central Service	Double track. Includes parking enhancements at all stations in the project study area.	Identified by Metra
Express Service	Union Pacific Northwest Line/McHenry Extension from Barrington to Chicago	Identified by Metra
Station Improvements	Prairie Crossing near Harris Rd. North Glenview (northern Cook County) Great Lakes Naval Station Pingree Rd. (eastern McHenry County) Grayslake	Combination of 1998-2002 TIP and identified by Metra
Pace		
New Route	Lakehurst to Lake Cook Rd. (Specific route not identified at this time)	1998-2002 TIP
Transportation Centers	Waukegan Transportation Center Gurnee Mills Transportation Center	Identified by Pace
Shuttle Services	UP North Braeside to Lake Cook employment centers North Glenview to I-294 employment centers (Specific routes not yet identified)	Identified by Pace

- New commuter rail service on the EJ&E Railroad between Spaulding (near Hoffman Estates) and Waukegan. Eight stations are recommended for development on this proposed line: Waukegan, North Chicago, Roundout, Leithton, Lake Zurich, Barrington, Prairie Stone, and Spaulding. These locations were selected for their proximity to residential areas, employment centers, and transfer capabilities to Metra's other radial commuter lines.
- Improved service on the MD North line by adding central train control and passing tracks from Roundout to Fox Lake. Install a turnback at Roundout to improve the reliability of commuter train and the level of service, particularly for the reverse commuter.
- Relocate freight traffic from the MD North line and consolidate it on the UP Freight line.
- Add 5,500 parking spaces to current commuter rail stations.
- Construct new stations at the junctions of all rail lines.
- Several rail service extensions are undergoing studies by other agencies and could be incorporated into LCTIP's alternatives as they are completed. These proposals include extending the Skokie Swift service (Chicago Transit Authority yellow line) to Deerfield Road in Highland Park; extending the MD North line commuter service from Roundout to Wadsworth; and extending the MD North line commuter service from Fox Lake to Richmond.

The total estimated cost of these improvements, excluding the ongoing study of the Skokie, Wadsworth, and McHenry extension, is $375 million (1999 dollars). The NCS upgrade, included in the No-Action Alternative (Baseline), is estimated to cost an additional $310 million (1999 dollars). These transit proposals would be common to each roadway alternative.

3.4.1.2 Bus

The LCTIP proposes a combination of bus services to enhance service and ridership that are consistent with long-range plans and regional and local service providers. The bus improvements would be comprised of express bus service in select corridors, improved trunk line bus service in five travel corridors, specialty bus services (e.g., shuttle services between rail stations and major employment campuses), and improved local service. The complete list of these bus improvements is presented in Table 3-3 (on the following page), and further details can be found in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

The express bus service would be provided for up to 10 routes over the planning period (year 2020); see Figure 3-5. This service would provide reasonably rapid bus transportation between major origins and destinations with a limited number of stops.

The LCTIP analyzed travel patterns in the county to identify corridors with high volumes of auto trips between specific origins and destinations. The LCTIP concluded that five travel corridors in the county have a high volume of home to work trips that would benefit from an efficient trunkline bus service; these corridors are described in Table 3-4 (on page 3-7) and shown in Figure 3-6. Frequent bus headways would be provided along each of these corridors, ranging from 15 to 30 minute intervals for Corridors 1 through 4. Along Corridor 5, a bus rapid transit service with 16 station locations is recommended. Total ridership for the five bus corridors is anticipated to be 6,000 to 10,000 passengers per day.

Other shuttle services would include a bus shuttle service between the Vernon Hills Station (North Central Service) and Corporate Woods on IL 60.[4] A similar service was pioneered by the Lake Cook TMA along Lake Cook Road. The service provided a mix of

[4] A similar service has been implemented and discontinued by Pace. LCTIP recommends that service be implemented when the NCS is upgraded to the full build out (52 trains per day).

scheduled and demand-responsive bus service for employers along the corridor. In January 2001, funding was granted for a shuttle bus service to operate from the North Glenview (Techny) Metra Station. Additionally, an existing local bus service was considered and several routes were identified for increased service frequency (see Table 3-4).

The estimated cost of the bus service improvements is estimated to be over $75 million. Approximately 85 percent of this cost would be related to a bus rapid transit service along Lake Cook Road.

3.4.2 Transportation Centers

Another component of the overall transportation improvements is transportation centers. This component would add opportunities for bus-to-bus and bus-to-rail transfers, as well as improved automobile connections at five key locations: Round Lake, Libertyville, Palatine, Highland Park, and Fox River Grove (Figure 3-6). Transportation transfer centers are important to the integration of modal transportation service with enhancements to auto access, passenger drop-off, bus-to-bus interconnections, and bus-to-rail interconnections.

Each location would include bus stands, bike and pedestrian access, bike storage, and real time displays of service information. Timed coordination of bus schedules is also recommended to allow easy transfer to rail services as well as between bus routes at the transportation centers.

3.5 Roadway Alternatives

3.5.1 Alternatives Development Process

The LCTIP applied a rigorous and highly structured process to the development of roadway alternatives, as documented in the *Alternatives Development and Evaluation Report* (LCTIP 2000a). The process followed these guiding principles:

- The roadway alternatives would include improvements constrained by neither location nor orientation (i.e., east-west or north-south).

TABLE 3-3
Bus Service Improvements

Improvements
Corridor 1—Winthrop Harbor-Waukegan Corridor
Corridor 2—Waukegan-Round Lake Corridor
Corridor 3—Gurnee-Libertyville-Buffalo Grove Corridor
Corridor 4—Highland Park to Fox River Grove Corridor
Corridor 5—Bus Rapid Transit in Lake Cook Corridor
Shuttle Services—Vernon Hills Station-NCS to Corporate Woods
Express Bus Service—Gurnee to Lake Cook Road, via I-94
Express Bus Service—Grayslake to Rolling Meadows via IL-53 EXT
Express Bus Service—Lake Cook Rd to I-190 via I-294
Express Bus Service—Waukegan to Grayslake via IL-120
Express Bus Service—Express bus service on two routes. (Elgin/ Hoffman Estates/Buffalo Grove) (Hawthorn/Long Grove/Libertyville)
Express Bus Service—Express bus service on four routes (East Dundee/ Algonquin/Crystal Lake) (Evanston/Glenview) (Libertyville/Ft Sheridan-Vernon Hills) (Northbrook/Glenview)
Local Service—Increased service frequency on Routes 234, 563, 565, 690, 723, 806
Local Service—Increased service frequency on Route 571

- The roadway alternatives could differ in the type and extent of improvement, but would provide systemwide travel benefits approaching the goals of the endorsed 2020 RTP.

Early in the roadway alternative development process, the LCTIP established that the No-Action Alternative (Baseline) would represent the foundation or initial building block for the roadway alternatives. The LCTIP concluded that the No-Action Alternative (Baseline) with its 119 km (74 mi) of improvements to existing roadways was a good starting point, but by itself would not successfully address future congestion in Lake County—projected to double by the year 2020 under the No-Action Alternative (Baseline) (LCTIP 1999). The roadway alternatives described in the following discussion go beyond the No-Action Alternative (Baseline) to begin to address the projected travel needs of the county.

Another early step in the roadway alternative development process was to establish a benchmark or point of reference for developing the initial range of roadway alternatives. The 2020 RTP was selected as the benchmark because it represented a regional endorsed level of transportation improvement and performance for the area. The transportation improvements represented in the 2020 RTP were quantified as areawide travel performance measures by the project team, and were used as a benchmark to determine when a specific set of roadway improvements achieved the objective, thereby qualifying as an alternative.

The LCTIP developed the initial alternatives (LCTIP 2000a) using broad travel performance measures that described both the efficiency and effectiveness of each alternative over the entire transportation system. These measures included delay per vehicle miles of travel, average network speed, and weighted congested vehicle hours of travel. Later in the process, when the

TABLE 3-4
Candidate Bus Improvements

	Corridor	Description
1	Winthrop Harbor-Waukegan Corridor	Originates near the Wisconsin state line and operates with alternating service on Green Bay Rd. and Lewis Ave. to the Waukegan Transportation Center. The route extends southward from the transportation center into central Waukegan and North Chicago; a branch service continues west from the Gurnee Transportation Center on Washington St to the Gurnee Mills Shopping Center and major employers.
2	Waukegan-Round Lake Corridor	From the Waukegan Transportation Center, route runs west to the Lake Villa rail station, then on Fairfield Rd., south to Rollins Rd., east on Rollins to Cedar Lake Rd., then south on Cedar Lake Rd. to the Round Lake rail station, continuing southeasterly on Nippersink Rd. and IL 134 to IL 120, the Grayslake rail station, and then east on IL 120 to the Waukegan Transportation Center. Service would operate in both directions on this loop route pattern.
3	Gurnee-Libertyville-Buffalo Grove Corridor	From the route end at the Gurnee/Wadsworth Transportation Center, service proceeds on Washington St. to O'Plaine Rd., south to Buckley Rd. (IL 137), then west to Milwaukee Ave and the Libertyville rail station. From the rail station, the bus trunkline continues south on IL 21 to IL 60, proceeds west on IL 60 to Butterfield Rd, then south on Butterfield Rd to US 45, the Vernon Hills rail station, continuing to Milwaukee Ave. (IL 21) and south to Deerfield Rd., the Buffalo Grove Transportation Center/rail station, and terminating at Lake Cook Rd. and Weiland Rd.
4	Highland Park-Fox River Grove Corridor	Service begins at the UP North Line Highland Park rail station, proceeds northerly on Green Bay Rd. then west on Half Day Rd. (IL 22) to US 45 and the Prairie View Station on the MD North Line, then west on Port Clinton Rd. and south on IL 83 to return to Half Day Rd./Lake Zurich Rd. and on to the Fox River Grove Station on the UP Northwest Line.
5	Bus Rapid Transit in Lake Cook Corridor from the lakefront to Palatine Station	Begins at the Highland Park Metra rail station on the UP North Line, uses US 41 to reach Lake Cook Rd. and then continues west with a detour to the Buffalo Grove Metra station on the MD North Line. Using Hicks Rd., it cuts south to terminate at Palatine Station on the UP Northwest Line.

initial alternatives had been screened and refined, a separate set of performance measures, specifically related to the purpose and need (Section 1), were used to evaluate them.

Following the completion of the early steps, the process adapted the use of the LCTIP travel demand model to the development of the preliminary roadway concepts. The modeling process was used to develop preliminary roadway concepts starting from one of five "starting point" improvements that included I-94, US 12, IL 83/US 45, IL 120 (existing and new alignment), and the IL 53 extension. These starting points were selected because they are regional in character, embrace the most prevalent congestion in the county, and exhibit continuity through the study area. Further, these starting points would allow the LCTIP to develop roadway alternatives with a broad geographic range. Using this step by step computer-aided approach, the most congested routes were targeted to develop groups of roadway improvements that approached or met the performance benchmark.

Another aspect of the roadway alternatives development process was the use of environmental resources information. The compilation of this data in the early stages of the process provided the LCTIP with the major environmental resource issues that could be considered during the initial stages of alternatives development. The environmental resource data for the very large study area was managed with the use of a GIS database containing over 80 data layers (see Appendix A). The LCTIP GIS database contains information related to water resources, wetlands, vegetative cover, population, employment, land use, and protected lands to name a few. The initial output from the database was a set of maps denoting the key environmental resources or constraints that were considered in the development of the roadway alternatives.

Public involvement was also an important part of the alternatives development process. Early in the process, input was sought through several forums to define the transportation problems in Lake County. These include:

- Focus group sessions with area residents, which concluded that development is outpacing infrastructure, and that roadway improvements should be the priority, followed by transit.
- A Transportation Fair and Workshop hosted by the LCTIP, which brought together elected officials and transportation providers who were asked to rate the effectiveness of various solutions; roadways were rated the highest, followed by transit and other strategies.
- Meetings and review with established study groups (e.g., the Technical Advisory Group, Municipal Groups, and the Resource Agency Group) that produced several transportation objectives, including the development of alternatives that would attract travel to the appropriate roadways, alternatives that provide would sufficient capacity on the major roadways, and alternatives that would provide improved transit services.

For a complete discussion of the agency coordination and public involvement that occurred during this study, refer to Section 5, *Coordination*.

3.5.2 Preliminary Roadway Concepts

The initial alternatives development process produced 12 preliminary roadway concepts (Figure 3-7). For each of the preliminary concepts, the No-Action Alternative (Baseline) is a common feature. Table 3-5 (on the following page) provides a description of the 12 preliminary concepts. Each preliminary concept was reviewed by the project team to refine the physical configuration (i.e., logical extensions of the improvement limits), and determine if any concepts should be dismissed from further evaluation. Those concepts that were dismissed from further consideration are discussed in Section 3.5.3, *Preliminary Roadway Concepts Dismissed from Further Study*.

TABLE 3-5
12 Preliminary Concepts

Concept	Route Miles of Improvement	Description
I-94 Starting Point—IL 60 to IL 132	63	The starting point improvement included added travel lanes on I-94 from IL 60 to IL 132. Additional roadway improvements include added travel lanes on I-94 from IL 132 to the Wisconsin state line, and along US 12, IL 83/US 45, and IL 60 (Figure 3-7, map 1 of 12).
I-94 Starting Point—IL 60 to Wisconsin State Line	80.9	The starting point improvement for this concept included added travel lanes on I-94 from IL 60 to the Wisconsin state line. Additional roadway improvements include added travel lanes are on IL 83/US 45, IL 60, US 12, and US 41 (map 2 of 12).
	82.7	A second concept was produced from the I-94 (IL 60 to Wisconsin state line) starting point. Additional roadway improvements for this concept include added travel lanes on IL 83/US 45, IL 60, IL 120 (partially on new alignment), and US 41 (map 3 of 12).
IL 83/US 45 Starting Point— Lake Cook Road to IL 120	63	The starting point for this concept represents improvements to IL 83/US 45. Additional roadway improvements for the concept would include added travel lanes on IL 21, I-94 and US 12 (map 4 of 12).
	62	A second concept with the IL 83/US 45 starting point was produced consisting of additional travel lanes IL 21, I-94 and IL 120 (on partial new alignment) (map 5 of 12).
IL 53 Starting Point	27	This concept consists of a 6-lane **freeway** extension of IL 53 northward from Lake Cook Road to a 4/6-lane bypass of the Grayslake area generally following the existing IL 120 corridor. These improvements would mostly be on a new alignment (map 6 of 12).*
	27	A second concept would consist of a 6-lane **tollway** extension of IL 53 northward from Lake Cook Road to a 4/6 lane bypass of the Grayslake area generally following the IL 120 corridor. These improvements would mostly be on new alignment. The eastern leg along IL 120 would be non-tolled. (map 7 of 12).*
	40	A third concept would consist of a 6-lane **arterial** extension of IL 53 northward from Lake Cook Road to a 4/6 lane bypass of the Grayslake area generally following the IL 120 corridor. This concept would also include added travel lanes on I-94 (map 8 of 12).
IL 120 Starting Point– Wilson Road to I-94 (existing or new alignment)	84.6	The starting point improvement for this concept includes added travel lanes on existing IL 120. Additional improvements for this concept include added travel lanes on US 12, IL 83/US 45, I-94, and US 41 (map 9 of 12).
	56	The starting point improvement for this concept would be a new 6-lane arterial partially on new alignment. Additional improvements for this concept include added travel lanes on IL 83/US 45, I-94, and IL 60 (map 10 of 12).
US 12 Starting Point– IL 53 to IL 120	53	The starting point improvement for this concept would include added travel lanes on US 12. Additional improvements for this concept include added travel lanes on IL 120 (on partial new alignment), I-94, and IL 60 (map 11 of 12).
	25.9	The starting point improvement for this concept would involve added travel lanes and the conversion of US 12 to an **expressway.** Interchanges would be constructed at all major intersections and frontage roads would be added to manage local access. This concept would include added travel lanes on I-94 (map 12 of 12).
* Interchange access at Lake Cook Road, IL 22, Midlothian Road, Peterson Road, Wilson Road, Fairfield Road, Alleghany Road, US 45, Hunt Club Road, IL 21, I-94, O'Plaine Road		

3.5.3 Preliminary Roadway Concepts Dismissed from Further Study

3.5.3.1 I-94 Starting Point (IL 60 to Wisconsin State Line)

After careful examination of the preliminary concepts, two I-94 concepts were eliminated from further consideration (Maps 2 and 3 of 12, Figure 3-7). These concepts were both developed from the I-94 starting point with improvements from IL 60 to the Wisconsin state line (Figure 3-7). The principal reason for their elimination was their having substantially more route miles of improvements than other concepts, while providing travel performance within the same bandwidth as the other preliminary concepts. The other key reason for their elimination was these concepts having similarities to the other concepts (i.e., improvements to the same routes). For example, in Figure 3-7, the I-94 concept [map 1 of 12] and the IL 120 concept [map 10 of 12] offer many of the same improvements with less route miles (in this example over 20 fewer route miles of improvement) needed to achieve similar performance. The project team concluded that there was no reasonable justification for retaining concepts that were redundant.

3.5.3.2 US 12 Expressway

The US 12 as an expressway concept was also dismissed from further consideration (Figure 3-7, Map 12 of 12). Although some partial access control could be added to an existing roadway, the practicality of a complete upgrade to an expressway along the existing alignment was considered inappropriate by the LCTIP. Upgrades of this magnitude are rarely pursued in the suburban metropolitan area because of the severe impacts to adjacent properties. Additionally, consideration of an expressway along US 12 (while not considering this type of improvement for other arterial facilities) was deemed to be inconsistent by the LCTIP. Therefore, it was concluded that a roadway concept with US 12 as an expressway was neither reasonable nor consistent with the treatment of other arterial routes, and should be dismissed from further consideration.

3.5.4 Initial Roadway Alternatives

The nine concepts that emerged from the preliminary roadway evaluation were carried forward in the process for further consideration. These roadway concepts were refined to include added engineering detail, resolution of route continuity and logical termini issues, and avoidance or minimization of environmental impacts based upon existing and available data. The process involved staff workshops and field checks to verify conditions and information at critical locations. Each alternative was critically reviewed to identify and implement alignment shifts, constrain right-of-way footprints, and/or community bypasses to avoid or minimize substantive environmental or social impacts. Key roadway intersections were also reviewed and upgraded as necessary to include grade-separated interchanges at some locations; roads crossing or connecting the major improvements were upgraded in accordance with IDOT and ISTHA standard practices. Figure 3-8 shows the nine initial roadway alternatives.

The process of refining the initial roadway alternatives included the application of typical cross sections to each of the alternatives. The typical sections assumed lane, median, and right-of-way widths for each type of roadway improvement being considered (Figure 3-9). The right-of-way widths of the cross section were designed to generally satisfy Lake County's stringent stormwater management standards, provide flexibility in grading requirements, and accommodate bicycle and pedestrian facilities. These typical cross sections were applied to the LCTIP GIS database to assess potential social and environmental impacts. None of the natural resource impacts were considered to be "fatal flaws," serious enough to prohibit the construction of any alternative. Displacement impacts were also reviewed, with five locations being identified as having substantial impact to residential and commercial areas. These locations are IL 21 in Libertyville,

US 45 in Mundelein, IL 60 near Diamond Lake, US 12 in Palatine, and IL 120 in Grayslake. Each area was the subject of further study and refinement to avoid a substantial community disruption (see *Community Bypass Evaluation* below).

The LCTIP presented the nine initial roadway alternatives and preliminary transit improvements at a series of public forums, including the established study groups and a series of Public Informational Meetings. An overwhelming majority of participants agreed that major transportation improvements are needed in one form or another in the study area.

3.5.4.1 Community Bypass Evaluation

One of the most important steps in the refinement process was the analysis of community bypass options in five locations:

- IL 21 in Libertyville
- US 45 in Mundelein
- IL 60 near Diamond Lake
- US 12 in Palatine
- IL 120 in Grayslake

The initial assessment revealed that major roadway improvements on the existing roads in these areas would result in a substantial displacement impact; for additional details refer to the *Alternatives Development and Evaluation Report* (LCTIP 2000a). For the initial roadway alternatives that would affect these areas, the LCTIP examined options for improving travel in these corridors while minimizing residential and commercial displacements. Community bypasses were studied at each location, and bypasses were recommended at four of the five locations. The analysis showed that a bypass of US 12 in Palatine was not necessary. The following is a summary of the analysis and recommendations:

- **Libertyville—**Bypass options were developed to the west using IL 60, Butterfield Road and IL 137, and to the east using IL 60, St. Mary's Road, and IL 137. The east bypass is recommended because it would have one-third to one-half fewer displacements as compared to the other options.
- **Mundelein—**Bypass options were developed to the east using IL 60, Butterfield Road, and IL 137, and to the west using IL 83, or using portions of IL 83 and the IL 53 extension corridor. A west bypass using the IL 53 corridor is recommended because it would have one-third to one-half the number of displacements as compared to the other options.
- **Diamond Lake Area**—A bypass option was developed using a portion of the IL 53 corridor, and is recommended because it would have one-third fewer displacements than the "through route" option.
- **Grayslake**—A bypass option was developed on new alignment to the south of existing IL 120, from Wilson Road to Almond Road. The bypass option was selected because it would displace half as many homes as the "through route" option.

Figure 3-10 shows the bypasses considered and routes selected at each location, and Figure 3-11 is a summary of the bypass evaluation. The selection of a Grayslake bypass resulted in the elimination of one roadway alternative—the IL 120 on existing alignment option (Figure 3-8, map 7 of 9), which was developed with improvements to existing IL 120. The remaining alternatives that include IL 120 defined the improvement as a bypass; therefore, these alternatives were retained for further analysis. The selected bypasses were then incorporated into the remaining roadway alternatives as appropriate.

3.5.4.2 IL 53 Freeway/Tollway Refinements

The refinement process for the initial alternatives included further examination of the IL 53 roadway alternatives. This analysis of the IL 53 freeway and IL 53 tollway options lead to a decision to combine these options into one alternative: the IL 53 Freeway/Tollway Alternative. Two factors provided the necessary justification to combine the options: their identical footprints (roadway cross section, interchange locations,

length, etc.), and their nearly identical systemwide travel performance. Three travel performance measures were considered:

- Vehicle hours of delay during the peak travel period in the year 2020.
- Average systemwide speed during the peak travel period in the year 2020.
- Weighted percent congested travel during the peak travel period in the year 2020.

For the three performance measures considered, vehicle hours of delay (VHD/MVMT), average speed (VMT/VHT), and weighted percent congested (VHT), the percent differences are 2.5 percent, 1 percent, and 1 percent, respectively. The differences between these performance measures are marginal. As such, the IL 53 Freeway/Tollway options were combined, and will be referenced in the following sections as one alternative.

Other refinement consideration of the IL 53 Alternative included an analysis of the alignment. In prior work, a recorded centerline was established and refined, which will be referred to as the "current" alignment. This earlier work included efforts to avoid critical habitat; however, some encroachments would nonetheless occur to ADID wetlands and 4(f) properties (i.e., Leo Leathers Park in Mundelein and Almond Marsh Forest Preserve in Grayslake). The LCTIP revisited these impact issues by examining the feasibility of alternate alignments that may avoid impact to these resources and others. This approach is consistent with efforts to refine the arterial based alternatives. The analysis assumed the following:

- The north-south study corridor is generally defined as an 8 km (5 mi) band width. The Lakewood Forest Preserve established the boundary to the west, and IL 83 was established as the eastern boundary. The boundary on the south is Lake Cook Road, and the boundary on the north is IL 120.
- The east-west study corridor is bounded by existing IL 120 to the north, the current alignment to the south, IL 137 to the west, and Almond Road to the east.
- The south terminal at Lake Cook Road and the east termini along IL 120 (near Almond Road) are fixed due to development and environmental constraints.
- Each alternate alignment was analyzed as a fully access-controlled route, with a 70-mph design speed, 91 m (300 ft) right-of-way width, and potential interchanges at 3.2 to 8 km (2 to 5 mi) spacing.
- Impacts were assessed for the mainline improvement only.

The LCTIP compiled environmental resource data and aerial base mapping to begin the process of identifying potential alignments. Environmental resources were mapped on the aerial base mapping (1997) and included ADID and non-ADID wetlands, lakes, nature preserves, natural areas, forest preserves, and cemeteries. The mapped environmental data allowed the LCTIP to develop a number of alignments that would avoid or minimize impact to the known resources (Figures 3-12, 3-13, and 3-14). Additional refinements to the alignments were performed following field checks to locate recent residential and commercial development, or other information not shown on the aerial photography.

Following the development of the alternate alignments, travel performance for the alternatives was compared to the performance benchmark described earlier in the roadway alternative development process. The assessment results indicated that all of the alignments would meet the performance benchmark and should be further analyzed in terms of societal and environmental impacts.

A summary of the environmental and societal impacts for the alternate alignments for the IL 53 Alternative are presented in Table 3-6 (on the following page) for the current alignment and the best alternate—BCE, and provides a detailed comparison of all the alternate alignments considered.

North-South Corridor. A total of nine new alignments were identified, with eight of them being to the west of the current IL 53 alignment. The alignment to the east ("KK") was eliminated due to its relatively larger number of displacements (88 versus 17) compared to the current alignment.

The western alternate alignments are comprised of three basic segments, with two distinct alignments within each segment. The first segment, between Lake Cook Road and IL 22, has alignments that avoid the Buffalo Creek ADID wetland ("A") or relatively dense residential development ("B"). The second segment, from IL 22 to Schwerman Road, offers two options ("C" and "D"). The third segment provides two options for connecting to the east-west leg of the IL 53 proposal ("E" and "F") while avoiding an 81-ha (200-ac) wetland mitigation site.

When comparing the various alignment combinations, ADID wetland impacts ranged from 0.0 to 0.8 ha (0.0 to 2.0 ac), as compared to 2.6 ha (6.4 ac) along the current alignment. Impacts to non-ADID wetlands ranged from 15.8 to 19 ha (39 to 47 ac), as compared to 11.3 ha (28 ac) along the current alignment. Total displacements ranged from 42 to 109, compared to 24 along the current alignment. The best overall western alignment was identified as "BCE." As summarized below, alignment "BCE" would have 50 percent higher impacts to non-ADID wetlands and 75 percent more commercial and residential displacements when compared to the current alignment. Alignment BCE, however, would have slightly less impacts to ADID wetlands and 4(f) properties when compared to the current alignment.

East-West Corridor. Alternate alignments for the East-West Corridor included an alignment along existing IL 120 from Atkinson Road to Almond Road. This alignment would impact slightly less acreage than the current alignment in terms of parks (1 versus 1.8 ha, or 2.5 versus 4.5 ac), forest preserves (0.85 versus 1.9 ha, or 2.1 versus 4.6 ac), and non ADID wetlands (5.3 versus 6.2 ha, or 13.2 versus 15.3 ac). However, this alignment would result in a higher number of residential and commercial displacements (almost three times greater). Overall, the alternate alignment would not appreciably reduce impacts to key resources, while resulting in a threefold increase in the number of displacements. Additionally, this alternate would eliminate a substantial amount of business parking at the US 45/IL 120 intersection.

In summary, the alternate alignments would not provide any improvement in the overall travel performance. The effects of the alternates vary compared to the current alignment. The total impacts to wetlands are less for the current alignment than the alternates. The alternate alignments would have less impact to forest preserve and park properties; however, the current alignment only impacts these resources slightly more. The alternate alignments have far greater impacts to residences and businesses, ranging from 2 to 3 times more than the current alignment. Based on less overall wetland

TABLE 3-6
Evaluation of Alternate IL 53 (North-South) and IL 120 (East-West) Alignments Corridor: Impact Summary

Corridor	ADID Wetlands ha (ac)	Non-ADID Wetlands ha (ac)	Forest Preserves/Parks ha (ac)	Displacements	Improvement Length km (mi)
North-South Corridor					
Current	2.6 (6.4)	11.5 (28.5)	0/1.26 (0/3.1)	24	19.8 (12.3)
BCE	0.8 (2.0)	17.3 (42.7)	0/0 (0/0)	42	22.5 (14.0)
East-West Corridor					
Current	0.2 (0.6)	6.2 (15.3)	1.9/1.8 (4.6/4.5)	6	
"HH"	0.2 (0.6)	5.3 (13.2)	0.8/1.0 (2.1/2.5)	17	

impacts and substantially less displacement of residential and commercial structures, this analysis concluded that none of the alternate alignments was superior to the current alignments for the north-south and east-west improvements in terms of transportation performance or environmental effects. On the basis of this analysis, the current IL 53 Freeway/Tollway centerline will be retained for further study and refinement.

3.5.5 Other Proposals Considered

During the development of the roadway alternatives, the LCTIP considered two other proposals. One of the proposals, the East-West case study, was developed by the LCTIP and responded to a perception that the major direction of travel in the county is east and west. The other proposal, *Crossroads*, was submitted by interest groups. The following is a summary of the LCTIP's findings with regard to each proposal. A detailed review is contained in the *Alternatives Development and Evaluation Report* (LCTIP 2000a).

3.5.5.1 East-West Case Study

Early in the process of defining transportation problems in Lake County, some people expressed the opinion that east-west roads are more congested than north-south roadways. The LCTIP and other transportation providers in the area recognize that there are east-west travel needs in Lake County, and through a collaborative process identified more than 64 km (40 mi) of east-west roadway improvements as part of the No-Action Alternative (Baseline).

In response to comments, however, the LCTIP developed and tested an "east-west" improvement scenario with an additional 80 route miles of improvements (Figure 3-15). The performance of this scenario, while having considerably more route miles of improvements, was worse than any of the other LCTIP roadway alternatives, achieving only 78 percent of the performance benchmark. These results are consistent with an analysis of travel patterns, which shows that north-south travel is predominant and the system lacks sufficient north-south capacity. Based on these findings, an East-West Improvement was dismissed from any further consideration.

3.5.5.2 Crossroads

The Environmental Law and Policy Center (ELPC) and Citizens Organized for Sound Transportation (COST) have proposed limited roadway improvements and the addition of some rail service as the solution for Lake County's transportation needs in a document titled *Crossroads: Smart Transportation Options for Lake County*. They suggest that implementing these improvements would lead to greater congestion relief when compared to the endorsed 2020 RTP.

The LCTIP analyzed the *Crossroads* proposal with the appropriate 2020 population and employment forecast and compared it to the regionally endorsed 2020 RTP. The RTP improves travel times by about 10 percent on 145 km (90 mi) of major roadways, whereas the *Crossroads* proposal improves travel times by the same margin on only 14.5 km (9 mi) of major roadways (Figure 3-16). As such, the *Crossroads* proposal is not as effective in reducing congestion levels and accommodating Lake County's future growth. For a detailed review of the *Crossroads* proposal refer to a report titled *Review of the Crossroads Proposal* (LCTIP 2000b).

3.5.6 Conclusions – Initial Roadway Refinement Process

The initial roadway alternatives were subjected to numerous refinements, analyses, and considerations. The process considered engineering requirements, environmental/societal impacts, as well as public perception (i.e., East-West Case Study). The results of this comprehensive process concluded that seven roadway alternatives would be carried forward for further study. The alternatives with their refinements are shown in Figure 3-17.

3.5.7 Environmental Considerations

The roadway alternatives development process involved numerous refinements and adjustments that would avoid or minimize impact to environmental and societal resources. Despite these efforts, however, implementation of any alternative would still affect environmental and societal resources to some degree. This section discusses the findings of an assessment of environmental factors for the seven remaining roadway alternatives. The effects of transit improvements were not considered as part of this assessment because these improvements would be common to all roadway alternatives and would provide no distinguishing measure of effect.

At the outset, the LCTIP recognized that the transportation problems in the county would require broad alternatives, covering many miles of roadway improvements. From an environmental perspective, this project also included developing an approach for identifying, measuring, and analyzing impacts at an equivalent level of detail. In response, the LCTIP developed a GIS database containing more than 80 different environmental data layers. The database primarily used existing and available data with some refinements based on reconnaissance level field surveys. The use and accuracy of available data were considered acceptable to the state and federal resource agencies involved in the project. (See Table 5-1, *Coordination for a List of Participating Federal and State Agencies.*)

In the early stages of the project, the GIS database was valuable in the development of the initial transportation improvement sets. Sensitive environmental areas were carefully researched, mapped, and coordinated with state and federal agencies. During the development of the roadway options, this information helped the alternatives development process avoid areas that would likely preclude the implementation of any improvement. During the latter stages of development, alternatives were refined to a greater level of environmental information to further avoid or minimize resource impacts. Thus, from the beginning of the process through the latter stages of alternatives development, the environmental resource issues have been carefully considered.

The environmental and societal effects for 10 factors were assessed for the roadway alternatives. A description of each factor and a description of the criteria for measuring impact are presented in Table 3-7 (on the following page). The estimated impacts for each roadway alternative are shown in Figure 3-18.

The emphasis placed upon avoiding and minimizing impacts during the alternatives development step is evident in the comparison of impacts for the seven roadway alternatives. For the key resources, including forest preserves, local parks, and wetlands, the degree of impact across the seven roadway alternatives was not substantially different. Putting the park impacts into perspective, the range of impact is from 1.2 to 2.8 ha (3 to 7 ac) depending on the roadway alternative. A difference of 1.6 ha (4 ac) across the suite of alternatives when compared to 6,070 ha (15,000 ac) of local parks in Lake County represents an impact difference of less than 0.03 percent. The number of individual park sites affected ranges from one to four, depending on the improvement set. A larger number of affected sites would require greater coordination with responsible resource agencies. Similarly, the range of impact for forest preserves is 1.2 to 6.5 ha (3 to 16 ac), and the number of individual sites affected ranges from two to seven. Considering that Lake County has 8,498 ha (21,000 ac) of forest preserve—a number that is growing annually—the range of impact for the roadway alternatives is less than 0.06 percent. Wetland impacts yield a similar comparison. The combined (ADID/non-ADID) range of wetland impact is 32 to 42 ha (79 to 104 ac), with a difference of 10 ha (25 ac) across the seven roadway alternatives. With over 18,500 ha (45,700 ac) of wetlands in Lake County, the difference of 10 ha (25 ac)

represents an impact of about 0.06 percent (see Figure 3-18).

A qualitative assessment of the resource impacts also revealed only minor differences between the roadway alternatives. Most of the forest preserve impacts are fringe impacts (no impact to an individual parcel is greater than 2 percent of the total land area) that would not impair the use or function of these designated uses. Wetlands designated as ADID represent a highly regulated resource, and in most cases require considerable coordination with resource agencies concerning their impact and mitigation. Efforts were made to avoid ADID wetlands where practicable; however, the impact numbers show that no option would

TABLE 3-7
Environmental and Societal Criteria

Criteria	Definition
Wetlands (ADID)	Impacts to ADID wetlands are measured by summing the hectares within the proposed right-of-way of the proposed improvement. A companion measure in this category is calculating the number of encroachments upon wetlands (multiple encroachments on the same property count as one site).
Wetlands (Non-ADID)	This measure is the sum of non-ADID wetlands directly impacted by the roadway improvements. The measure sums both hectares and the number of individual wetland encroachments.
Designated Lands	These lands include forest preserves, parks, nature preserves, and INAI sites, among others. All of these lands are highly regulated and generally protected under the US Department of Transportation Act of 1966. This measure is a sum of both the total acres of designated land impact, as well as the number of individual property encroachments (multiple encroachments on the same property count as one site).
Designated Lands with T&E	This is a measure of only those designated lands that also have a threatened and/or endangered species associated with the impacted area. The measure is expressed in hectares of impact.
Cultural Sites	Cultural resources are highly regulated by NEPA, and therefore represent a resource that is typically considered for highway improvement projects. This measure is an indication of the number of sites on known resources—those that have been identified through previous works. Each site represents a potential agency coordination effort that would be required to address the potential impact.
Acres of Agricultural Lands (with 0.8 km, or 0.5 mi, of improvement)	Agricultural lands are afforded limited protection through state and federal laws; however, they are recognized as a finite resource. Urban expansion is continually cited as a major reason for the conversion of agricultural lands to other uses. The argument is often applied to roadway improvements. This measure is an indication of the amount of agricultural land within 0.8 km (0.5 mi) that might be at risk to development because of secondary roadway effects (i.e., improved mobility and access).
Multiple Resource Impacts	This is a composite measure where multiple resources occur in the same impacted area, (i.e., wetlands and designated lands). This measure is a quality measure indicating property impacts with more than one resource. The measure is expressed as acres of land with multiple resources directly impacted.
Total Sites (wetland, designated lands, archeological sites)	This measure is the sum of all individual property sites for the named resources. This measure is an indication of the special resource impact that would require extensive coordination with resource agencies.
Displacements	A measure of the residential, commercial, and other structures that would be potentially displaced from construction of a roadway improvement set. The total displacements include structures within the proposed right-of-way and in close proximity (4.6 m, or 15 ft).
Undeveloped Lands within 0.8 km, or 0.5 mi, of Improvement	The notion that highways contribute to growth and development is always present. Therefore, this consideration was designed to examine the underlying issue of urban growth that is commonly perceived as being associated with improved mobility and access. The measure is not designed to predict the rate or time at which land may be converted, but to serve as a symbol/representation for land along the major roadway improvements that may be improved.

completely avoid ADID wetland resources. Thus, this highly regarded resource did not serve to distinguish between the improvement sets. An examination of potential impacts to threatened and endangered species also showed that each of the alternatives would impact this highly regarded resource category to a similar degree.

The residential and commercial displacements of each roadway alternative were also considered. Residential, commercial, and "other" buildings (garages, utility structures, etc.) within the proposed right-of-way or nearby (within 4.6 m or 15 ft) were identified as displacements. The number of displacements, summarized in Figure 3-18, range from 101 to 246 across the suite of roadway alternatives. Given the broad study area, the study team concluded that displacements should not be a reason to dismiss an alternative at this stage.

In summary, environmental resources were considered early and throughout the alternatives development and evaluation process, to an equal level of detail, and over a large study area. Considerable effort was made to avoid or minimize impacts during each stage of alternative development. The LCTIP and involved resource agencies agreed that for this type of study it was appropriate to use existing and available data and were comfortable with its limitations. From both a quantitative and qualitative perspective, the environmental impacts were determined to be similar. The process did not result in any roadway alternative differentiating itself when environmental issues were compared in a comprehensive manner relative to one another.

3.6 Finalist Recommendations

Following the development and refinement of alternatives, the LCTIP began a process of comparative evaluation of the seven remaining roadway alternatives, which would lead to the recommendation of finalist alternatives for inclusion in the DEIS. Guided by the project's fundamental transportation needs listed in Section 1, *Purpose and Need*, the LCTIP used evaluation factors that provide the best measure of transportation performance—measures that assess the inherent transportation capabilities of the roadway improvements. The remainder of this section describes the results of the comparative evaluation for the seven roadway alternatives.

The ability of a project to meet the identified transportation needs is the basic measure by which transportation projects are evaluated and judged. The evaluation factors used to compare roadway alternatives were developed to represent aspects that satisfy those needs. The evaluation process employs a rigorous technical analysis, using the project's travel demand model (with the regionally endorsed population, employment, and travel forecasts as base data) to generate measures that allow performance comparisons of the alternatives. The evaluation factors developed for the analysis were based on two needs: improve local and regional travel and improve north-south travel. Together they provide the most discriminating comparison of the seven roadway alternatives. Improving modal connections was not used as an evaluation factor at this stage because it is not a discriminating factor. All alternatives, however, will be structured to enhance modal connections. Safety was also not used at this stage, although each alternative is anticipated to generally improve safety performance. A greater level of detail is needed to definitively evaluate safety, which will be conducted for the finalists.

The evaluation factors embrace improving travel efficiency with the use of measures that compare travel-time savings and improving north-south travel with measures that show the change in congestion and in traffic volume on north-south routes. The specific measures used to compare and evaluate the roadway alternatives at this stage of the study are described below.

- **Travel Efficiency (Cumulative Travel Times)—**Transportation effectiveness was a measure of how well a roadway alternative would improve travel

efficiency within a geographical area that included Lake County, portions of northern Cook County, and eastern McHenry County. The measure was determined by aggregating travel times for all trips that started and ended within the aforementioned geographical area.

- **Uncongested Lane Miles—**This measure indicates the total lane miles that would be uncongested (defined as Level of Service A, B, or C) for the various roadway alternatives. It is an indicator of how well an alternative reduces the congested travel.
- **Change in Traffic Volume—**This measure reflects the effect of the various roadway alternatives on the volume of traffic on existing roadways. It also serves as a proxy for traffic intrusion in neighborhoods and communities. Traffic removed from local roads helps relieve or minimize cut-through traffic on neighborhood and local roads, which is an important issue among study area residents. The measure is expressed as the number of roadway route miles with an increase or a decrease of at least 3,500 vehicles per day compared to the LCTIP baseline traffic volumes. This measure was summarized for north-south travel.

These three evaluation factors were applied to the seven roadway alternatives. The results of the evaluation are summarized in Table 3-7. An overview of the evaluation results is provided below, followed by individual discussions of each roadway alternative.

The cumulative travel time savings analysis (Table 3-7) shows that the hours of travel saved for all trips in the typical P.M. peak travel period (year 2020) ranges from 62,700 to 83,400 hours of travel. The travel time savings is the difference between the No-Action Alternative (Baseline) and each roadway alternative—the greater the percent difference the greater the travel savings. The analysis showed that the IL 53 Freeway/Tollway Alternative would provide the best overall travel time improvement (19 percent) compared to the No-Action Alternative (Baseline). The least improvement would be provided by either the IL 120 Bypass Alternative or the US 12 Alternative, with a savings of 14 percent over the No-Action Alternative (Baseline).

The uncongested travel measure is an indication of the percent of the north-south roadways in 2020 that would be operating at free-flowing conditions in the P.M. peak period. Depending on the option, between 33 and 41 percent of the network (lane miles) would be operating congestion-free. The IL 53 Freeway/Tollway Alternative would provide the greatest amount of congestion-free travel, and the US 12 Alternative would provide the least.

The volume difference measure shows how the roadway alternatives would affect travel on the existing roadway network. A beneficial effect of the alternatives would be a reduction of traffic volume on existing roads, which would be an indication of reduced cut-through traffic and attraction of trips to major facilities. This measure examines the reduction in traffic on the existing road network for north-south segments, which is also related to the goal of reducing north-south travel congestion. The measure shown in Table 3-8 (on the following page) is simply the number of route miles on which daily traffic volumes would be reduced by 3,500 vehicles or more in 2020 as compared to the No-Action Alternative (Baseline). The IL 53 Freeway/Tollway Alternative provides the greatest reduction in traffic on existing north-south routes; the US 12 Alternative provided the least.

- **IL 53 Freeway/Tollway—**The IL 53 Freeway/Tollway Alternative was the top performer for all three performance measures, providing over 83,400 hours of travel time savings for the 2020 P.M. peak period and 125 routes miles of traffic relief on north-south routes as compared to the No-Action Alternative (Baseline). In addition, the IL 53 Freeway/Tollway Alternative had 41 percent of the north-south lane miles uncongested in the P.M.

peak period, which is the highest when compared to the other alternatives.

- **IL 83/US 45 with US 12—**The travel performance for the IL 83/US 45 with US 12 Alternative was the second best overall performer. The IL 83/US 45 with US 12 Alternative scored second in travel time savings with 75,100 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, IL 83/US 45 with US 12 Alternative scored second with 88 route miles. IL 83/US 45 with US 12 Alternative tied for third with two other alternatives, with roughly 38 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 53 Arterial—**The travel performance for the IL 53 Arterial Alternative varied by performance measure. The IL 53 Arterial Alternative scored fourth in travel time savings, with 70,200 hours for the 2020 P.M. peak period. In terms of relieving traffic on existing north-south roadways, the IL 53 Arterial Alternative scored third with 83 route miles. This alternative scored second with 39 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 83/US 45 with IL 120—**The travel performance for the IL 83/US 45 with IL 120 Alternative also varied by performance measure. This alternative scored third in travel time savings with 71,400 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, the IL 83/US 45 with IL 120 Alternative scored fourth with 68 route miles. This alternative tied for third with two other alternatives, with 38 percent of the north-south lane miles uncongested in the P.M. peak period.

TABLE 3-8
Traffic Performance for Refined Roadway Improvement Sets

Alternative[e]	Travel Time Savings [a]			Traffic Relief on North-South Roads [b]		Uncongested North-South Lane Miles LOS A,B,C [c,d]		Score
	Peak Period Hours of Travel Time Saved	% Improvement over No-Action	Score	Miles	Score	Percent	Score	
I-94	65,900	15%	3	67.9	3	38%	5	11
IL 83/US 45 with US 12	75,100	17%	6	88.12	6	38%	5	17
IL 83/US 45 (with IL 120)	71,400	16%	5	68.28	4	38%	5	14
IL 53 Freeway/ Tollway	83,400	19%	7	124.57	7	41%	7	21
IL 53 Arterial	70,200	16%	4	82.8	5	39%	6	15
IL 120 Bypass	64,000	14%	2	65.64	2	37%	2	6
US 12	62,700	14%	1	61.47	1	33%	1	3

[a] Travel Times Savings: This is a measure of the improvement in travel times for all trips that begin and end in Lake, northern Cook, and/or eastern McHenry counties. As an example, a 15-percent improvement would save about 10 minutes for a 1-hour trip during the afternoon rush hour, year 2020.

[b] Traffic Relief on North-South Roads: This is a measure of the total miles of existing north-south roads that would carry at least 3,500 fewer vehicles each day, year 2020.

[c] Uncongested North-South Travel: This is a measure of the percentage of north-south roads that would be uncongested during the afternoon rush hour, year 2020.

[d] A difference of 8 percent represents approximately 100 lane miles.

[e] LCTIP No-Action (Baseline) trip table

- **I-94—**The travel performance for the I-94 Alternative varied by performance measure. This alternative scored fifth in travel time saving, providing 65,900 hours for the 2020 P.M. peak period. In terms of relieving traffic on north-south roadways, the I-94 Alternative scored fifth with 67.9 route miles. This alternative tied for third with two alternatives, with 38 percent of the north-south lane miles uncongested in the P.M. peak period.
- **IL 120 Bypass—**The IL 120 Bypass Alternative was consistently placed sixth amongst the alternatives, with 64,000 hours of travel time savings for the 2020 P.M. peak period, and 66 route miles of traffic relief on north-south roadways compared to the No-Action Alternative (Baseline). Roughly, 37 percent of the north-south lane miles were uncongested in the P.M. peak period.
- **US 12—**The US 12 Alternative consistently performed the worst, with 62,700 hours of travel time savings for the 2020 P.M. peak period and 61 route miles of traffic relief on north-south roadways when compared to the No-Action Alternative (Baseline). Roughly, 33 percent of the north-south lane miles would be uncongested in the P.M. peak period.

Based on the data in Table 3-8, a composite score was determined for each roadway alternative representing an overall score of the three travel performance measures. The composite was developed by assigning a score of 1 through 7 in order of performance for each alternative for each measure, with 7 the best and 1 the worst. Based on the composite scores, the two alternatives selected were IL 53 Freeway/Tollway and IL 83/US 45 with US 12 alternatives (see Figures 3-19 and 3-20).

For each travel performance measure, the IL 53 Freeway/Tollway Alternative was the top performer. The travel performance for the IL 83/US 45 with US 12 Alternative scored either second or third for each performance measure. No other roadway alternative consistently scored as high for each performance measure. The US 12 Alternative was consistently the worst performing option, with 20,700 hours less travel time saving, over 50 percent fewer route miles of traffic relief, and 100 fewer lane miles of uncongested travel compared to the IL 53 Freeway/Tollway Alternative. Given the central premise of the evaluation process—to select alternatives that best met the transportation need—the IL 53 Freeway/Tollway and IL 83/US 45 with US 12 alternatives were selected as the finalist alternatives.

3.6.1 Description of the Finalist Alternatives

There are two finalist (Build) alternatives: IL 53 Freeway/Tollway and IL 83/US 45 with US 12. The No-Action Alternative (Baseline) will also be carried forward in the evaluation. The two build alternatives are comprised of the roadway improvements and the supporting transportation improvements described earlier in this section. The selection of the finalist alternatives was followed by another refinement step that would add more engineering detail. The added engineering detail included better definition of feeder road and intersection/interchange improvements, and additional improvements to each alternative. For the IL 53 Freeway/Tollway Alternative, improvements to I-94 and O'Plaine Road were added to better facilitate travel near a major system terminus, and for the IL 83/US 45 with US 12 Alternative improvements to IL 60 and IL 120 were added. During this refinement step, additional environmental information was collected, allowing the LCTIP to make further adjustments and shifts to roadway alignments that would lessen environmental and societal impacts. A general description of the finalist roadway alternatives and supporting improvements is provided below and includes the refinements described above.

3.6.1.1 IL 53 Freeway/Tollway Alternative

The IL 53 Freeway/Tollway Alternative consists of the construction of a new highway in central Lake County either as a freeway or

tollway facility (see Figure 3-19). The IL 53 Freeway/Tollway Alternative would begin at the terminus of IL 53 at Lake Cook Road and extend northerly for a distance of 21 km (13 mi) to a point south of IL 120. The alternative would continue for about 22.5 km (14 mi) both to the east and to the west. The eastern terminus would tie into the existing interchange complex at US 41, and the western terminus would be Wilson Road, with arterial improvements extending along existing IL 120 from Wilson Road to the intersection of IL 60 and IL 120. Additional lanes are proposed on I-94 from IL 120 to IL 132.

Access to the IL 53 facility would be gained on grade-separated interchanges at major arterials. These include: Lake Cook Road, IL 22, Midlothian Road, Peterson Road, Alleghany Road, US 45, IL 21, I-94, O'Plaine Road, Hunt Club Road, Wilson Road, and Fairfield Road. Improvements would be made to arterial highways through the interchange influence area to provide for proper roadway operations and safety. The length of improvements to arterial feeder roads generally extends to the nearest major intersection.

The IL 53 Freeway/Tollway Alternative would be constructed with three through lanes in each direction separated by a barrier median. The west leg would be four lanes. The typical right-of-way width required for the roadway is 91 m (300 ft), including a 23-m (76-ft) pavement (11.5 m or 38 ft in each direction), 8.5-m (28-ft) paved median, 3.7-m (12-ft) right shoulders, and grassed areas with roadside ditches. Where necessary to avoid critical natural and community resources, refinements were made to the typical cross section. These refinements included a reduction in right-of-way width to 76 m (250 ft).

The facility would be constructed as either a freeway or tollway. Both facility types have the same basic design elements and similar operational characteristics, but the tollway would require provision of toll collection facilities. The east leg would be non-tolled in either case. For the purposes of this study, construction of the alternative as a freeway versus tollway facility would be a future funding choice, depending on the alternative selected.

3.6.1.2 IL 83/US 45 with US 12 Alternative

The IL83/US 45 with US 12 Alternative includes approximately 101 km (63 mi) of improvements on existing roads, as well as new alignment. Approximately 80 percent of the improvements are on existing facilities and 20 percent are on new alignment to bypass established communities (see Figure 3-20). Table 3-9 summarizes the type of improvement proposed for each roadway.

TABLE 3-9
IL 83/US 45 with US 12 Alternative Improvements

Roadway	Improvement
Hicks Road	Widen from 2 to 6 lanes from IL 53 to IL 83
IL 83	Widen from 4 to 6 lanes from Hicks Rd. to US 45
Mundelein Bypass	New 4-lane road from IL 60/US 45 to IL 120 bypass
I-94	Widen from 6 to 8 lanes from IL 60 to IL 132
IL 21	Widen from 4 to 6 lanes from Lake Cook Rd. to IL 60; IL 137 to I-94
Libertyville Bypass	IL 60: Widen from 4 to 6 lanes from IL 21 to I-94 St. Mary's Rd.: Widen from 2 to 4 lanes from IL 60 to IL 137 IL 137: Widen from 4 to 6 lanes from IL 21 to I-94
US 12	Widen from 4 to 6 lanes from IL 53 to IL 176
IL 120 (New Alignment)	New 4-lane arterial from Alleghany Rd. to Almond Rd.

Existing intersections and interchanges along the widened highway corridors would be improved to provide adequate traffic operations at major highway junctions. The typical cross section for the proposed improvements included in the alternative would vary based on the type of facility and proposed number of lanes. The typical right-of-way width would generally be 40 m (130 ft) for a 4-lane arterial, 49 m (160 ft) for a 6-lane arterial, and 91 m (300 ft) for an 8-lane tollway. Where necessary to avoid critical natural and community resources, refinements have been made to the typical cross section to avoid or minimize impacts. These refinements included a reduction in right-of-way width, typically to 30.5 m (100 ft) for a 4-lane arterial facility, 36.6 m (120 ft) for a 6-lane facility, and 76.2 m (250 feet) for an 8-lane tollway. Refer to the *Alternatives Development and Evaluation Report* (LCTIP 2000a) for more details. Typical cross sections are shown in Figure 3-9.

3.6.1.3 Construction and Right-of-Way Costs

The LCTIP developed an estimate of project costs for the roadway alternatives based on a rigorous analysis. The cost estimates are identified in 1999 dollars and include both construction and right-of-way estimates. The construction costs estimates typically assume full roadway reconstruction and are based on major cost items such as grading, pavement, drainage, and bridges and retaining walls. The unit costs for the major construction cost items relied upon current IDOT project experience. The right-of-way estimates included both land and structure acquisition. Standard costs for land cost and structure costs were developed by township using Lake County tax assessor database and other available information such as the *Price Pulse* data. The project team used 1999 data to establish a common base for comparing the roadway improvement sets. See Table 3-10.

3.6.2 Supporting Improvements

3.6.2.1 Transit

As outlined in Section 3.4.1, *Rail and Bus Transit*, a comprehensive package of rail and bus improvements are recommended.

3.6.2.2 Transportation System Management

TSM strategies were fully considered as part of the transportation improvements. TSM applications are designed to make the transportation facilities function more effectively, work more reliably, and operate more safely. These strategies encompass improvements such as modernized traffic signal control systems that adjust themselves to optimize traffic flow, freeway traffic flow management, incident detection and response, system surveillance, intersection improvements, and traveler information services. In Lake County, TSM strategies have been widely deployed and represent the predominant type of improvement over the last decade. Since 1990, nearly 200 TSM projects have been implemented and about 70 more are planned from 2001–2005 (Figure 3-21). Among the existing and planned TSM improvements in Lake County are numerous intersection upgrades, inter-jurisdictional signal systems coordination, enhanced safety applications for highway-rail crossings, I-PASS on the tollway system, transit signal priority and arterial

TABLE 3-10
Construction and Right-of-Way Costs for the Finalist Build Alternatives (in 1999 dollars)

	Construction	ROW	Total
No-Action (Baseline)	$ 414,000,000	$ 69,000,000	$ 483,000,000
IL 53 Freeway/Tollway	$ 674,000,000	$ 187,000,000	$ 861,000,000
IL 83/US 45 with US 12	$ 735,000,000	$ 360,000,000	$ 1,095,000,000

incident management, and variable message signs.

The LCTIP proposes three types of TSM improvements: arterial traffic control systems, transit service management systems, and continuance of the existing programs. The arterial roadways in the county are an important element of the overall transportation system; therefore, particular attention in the TSM strategy has been given to arterial traffic signal control systems to improve traffic flow. This strategy recommends the deployment of an arterial system management strategy for the major routes (Table 3-11) that consistently display the most congestion and delay. As shown in Table 3-11, the priority routes would vary depending upon the build alternative selected.

The arterial strategy would consist of electronic arterial surveillance, signal system interconnects and communication with a traffic management center to manage traffic control and transit priority, variable message signs, incident detection and management, and highway advisory radio. It is recommended that a high-volume corridor in the county (i.e., Lake Cook Road) be selected as a testbed for this combination of technology. A consortium of CATS, Cook County, Lake County, and Northwestern University has funding to study and implement traffic surveillance and control systems in this Lake Cook corridor. Following an appropriate test period, deployment could be advanced to the other priority corridors.

Other features of the TSM strategy include transit management systems. A travel advisory information system would be deployed at Metra stations and parking lots to provide parking availability status and capacity, train schedules, etc. Advanced technology would also be deployed at rail-highway crossings to increase safety. Bus transit management systems would include automatic vehicle location, passenger and fare reporting, route and schedule tracking, voice and data communication between vehicles and the management center, and signal priority to facilitate transit vehicle flow.

TSM strategies are viewed as a complementary component of the overall transportation improvements in Lake County. TSM initiatives and strategies are needed and would support other transportation improvements in the county, but the scale of the projected population and employment growth cannot be addressed by these strategies alone. Experience has shown that despite the fairly aggressive TSM programs deployed in the last decade, roadway congestion has far outpaced these measures. Therefore, a major

TABLE 3-11
Priority Routes for Traffic Control Systems

IL 53 Freeway/Tollway Alternative	IL 83/US 45 with US 12 Alternative
I-94 (Tollway)	I-94 (Tollway)
IL 53 Freeway/Tollway	IL 120
IL 60	IL 60
IL 22	IL 22
IL 83	US 12
US 12	IL 83
US 41	US 41
IL 120 (existing)	Weiland Road
Weiland Road	Old McHenry's Road
Martin Luther King Jr. Blvd.	Long Grove Road
Washington Street	St. Mary's Road
Butterfield Road	IL 21

investment in transportation infrastructure is necessary to accommodate the travel demand generated by future population growth.

3.6.2.3 Travel Demand Management

TDM strategies represent another component of the LCTIP transportation alternatives. TDM strategies are designed to decrease vehicle demand on the roadway system by increasing vehicle occupancy or changing the attractiveness of competing modes. Currently, there are a number of TDM activities being applied in Lake County, including rideshare programs, employer activities, and public education programs. CATS, as part of the 2020 RTP, endorsed six TDM strategies: rideshare, improved pedestrian and bicycle facilities, park-and-ride facilities, expanded vanpool programs, parking management, and transit incentives. Each of these strategies is applicable to Lake County, and when implemented they could reduce traffic volumes by about 1 percent (LCTIP 1999) on the roadways in the county. Although the overall reduction appears small, TDM measures materially contribute to increasing the number of travel options for commuters.

The LCTIP examined the use of park-and-ride facilities in connection with the build alternatives. Park-and-ride facilities are essentially parking lots at strategic locations that allow people to drop off or leave their cars, and transfer to a bus system, carpool, vanpool, or even a commuter train if a rail station is nearby. In many parts of the United States, these facilities have enjoyed considerable success. In Lake County, two park-and-ride facilities exist at the Buffalo Grove and Gurnee transportation centers. A third park-and-ride facility is planned at a proposed transportation center in Waukegan. The LCTIP recommends additional park-and-ride facilities at the five proposed transportation centers that provide bus-to-bus and bus-to-rail transfer capabilities: Highland Park, Libertyville, Round Lake, Palatine, and Fox River Grove. Additionally, to facilitate carpooling and vanpooling on a broader geographic area, park-and-ride facilities are proposed at major interchanges or intersections where strategic regional arterials (SRAs) intersect, including major interchanges along I-94 and the proposed IL 53 Freeway/Tollway Alternative. Details and maps showing the locations of these facilities for the build alternative are included in *Transit and Transportation Management Strategies for the Lake County Transportation Improvement Project* (LCTIP 2001b). See Figures 3-22, 23, and 24.

Bicycle and pedestrian improvements have been considered as a complementary set of enhancements for the finalist build alternatives. These improvements are structured to mesh with existing and planned routes where appropriate. The improvements are described as potential opportunities that would require further consideration and analysis for the selected build alternative. The IL 53 Freeway/Tollway Alternative provides an opportunity for a linear shared path along its length with connections to existing bike paths via local roads such as IL 60 and IL 21 (Des Plaines River Trail) and IL 176 (Robert McClory Path). Direct connections to a linear bicycle/pedestrian path along the IL 53 Freeway/Tollway Alternative would be possible with extensions of existing paths, particularly between IL 120 and the proposed Des Plaines River Trail extension. Similarly, direct connections would be likely at several employment centers and rail stations such as the Grayslake and Prairie Crossing NCS rail stations , and Kemper Insurance, Motorola, and Baxter Health Care. The IL 83/US 45 with US 12 Alternative would also provide opportunities for new bicycle and pedestrian facilities along the rights-of-way of improved arterial facilities with direct connection to two existing bicycle paths: the Des Plaines River Trail and the Robert McClory Path. Additionally, indirect connections to the Skokie Valley Trail and the Green Bay Trail are possible. This alternative would provide numerous opportunities for connections to rail stations and employment centers. Further details and maps showing the alternatives in relation to existing bicycle/pedestrian paths and employment centers are contained in a technical memorandum titled *Transit and Transportation Management Strategies for the*

Lake County Transportation Improvement Project (LCTIP 2001b) (see Figures 3-22, 23, and 24).

3.6.3 Detailed Evaluation of the Finalist Roadway Alternatives

The final step in the process is a comparative evaluation of the two finalist build alternatives (IL 53 Freeway/Tollway and IL 83/US 45 with US 12 Alternatives). Each alternative was rigorously compared to the project Purpose and Need, which includes:

- Improving local and regional travel
- Improving north-south travel capacity and efficiency
- Improving safety
- Improving modal connections[5]

The comparative evaluation of the finalist build alternatives was based on alternative-specific population and employment forecasts developed for each alternative (ACG 1999, CATS 1997a, ACG 2000). These forecasts were subsequently used by CATS to develop a travel forecast for each of the finalist alternatives. The travel performance for each alternative was then re-evaluated using these refined alternative-specific travel forecasts. The re-evaluation provided new travel performance metrics for each alternative based on travel forecasts that are unique to each alternative, including the No-Action Alternative (Baseline). The following is a summary of the Purpose and Need measures used to compare the alternatives.

3.6.3.1 Improve Local and Regional Travel

Local Travel. Improvements to local travel were measured using "cumulative travel time savings." Travel time savings were derived from calculating the total travel time for all trips in the year 2020 and compared to the No-Action Alternative (Baseline). As shown in Table 3-12, each build alternative would save approximately 19 million hours of annual travel over the No-Action Alternative (Baseline) in 2020. This represents an 8-percent travel time savings over the No-Action Alternative (Baseline).

Early public involvement activities identified the rapid rise in travel along secondary roads as a primary concern of Lake County residents. Lake County officials requested that the LCTIP consider the effect the finalist roadway alternatives would have on future improvement needs along the county-maintained system. The LCTIP used criteria established by the Lake County Division of Transportation (LCDOT) to assess the need for additional capacity along county-maintained roadways. Traffic volumes greater than 15,000 ADT for 2-lane roads and volumes greater than 30,000 along 4-lane roads were considered as over capacity (i.e., requiring additional lanes). Table 3-13 (on the following page) summarizes the total lane miles that would exceed LCDOT's capacity threshold for 2- and 4-lane roads for the No-Action (Baseline), IL 53 Freeway/Tollway, and IL 83/US 45 with US 12 alternatives.

The IL 53 Freeway/Tollway Alternative would have a net reduction of 17 lane miles on 2- and

TABLE 3-12
Local Trips

Alternative	Total Annual Savings (hours)	Percent Improvement over Baseline	Annual Savings/Motorist (hours)	Annual Savings/Motorist ($)[a]
IL 53 Freeway/Tollway	18,700,000	8.3%	33.0 hours	$1584
IL 83/US 45 with US 12	19,100,000	8.5%	33.8 hours	$1622

[a] Based upon 48.00 hours for composite vehicle operating costs, Year 2020.

4-lane county roadways that would be over capacity in the year 2020 when compared to the No-Action Alternative (Baseline). The IL 83/US 45 with US 12 Alternative would have a net increase of 13 lane miles for the number of county roadways that would be over capacity in the year 2020 when compared to the No-Action Alternative (Baseline). Figures 3-25 and 3-26 depict the changes in capacity (i.e., red denotes a worsening, green an improvement) for each finalist alternative when compared to the No-Action Alternative (Baseline). As a new facility, the IL 53 Freeway/Tollway Alternative would attract a considerable volume of traffic from existing roadways, including county routes. Conversely, the IL 83/US 45 with US 12 Alternative would essentially redistribute traffic on the existing system, resulting in an increased burden on county roads.

Regional Travel. Improvement to regional travel was determined by measuring travel to or from several representative points in the area, including Lake Cook/US 12, IL 132/I-94 (Gurnee Mills), IL 60/I-94, and Kenosha (Wisconsin). Kenosha was analyzed as a destination location, whereas the other three locations were analyzed as locations from which trips originated. Each location represents a major business or commercial center proximate to major interchange points on the regional expressway system. The LCTIP travel demand model was used to show how the build alternatives would benefit travel time from all parts of the region to the destination location (Kenosha), or from the three points of origin to all parts of the region. The results of the analysis identified the geographic areas that would experience a travel time improvement (savings) of at least 5 percent compared to the No-Action Alternative (Baseline) during the P.M. peak travel period in the year 2020. Figures 3-27 through 3-30 illustrate the areas of the region that would realize at least a 5-percent travel time improvement. Table 3-14 (on the following page) summarizes the net number of Traffic Analysis Zones (TAZ) that would receive at least a 5-percent travel time savings for the four locations.[6]

The following summarizes the findings in more detail at each location:

- **Trips originating from the Lake Cook/US 12 area—**The IL 53 Freeway/Tollway Alternative improves travel times in McHenry and Lake counties, as well as portions of DuPage, Boone, and Kenosha (Wisconsin) counties. The IL 83/US 45 with US 12 Alternative improves travel times over a 10-percent smaller area that includes Lake and portions of McHenry, Boone, and Kenosha counties.
- **Trips originating from the IL 132/I-94 area—**The IL 53 Freeway/Tollway Alternative improves travel times in much of Lake, Cook, and DuPage, and portions

TABLE 3-13
County Maintained Routes

	No-Action (Baseline)	IL 53 Freeway/Tollway	IL 83/US 45 with US 12
2-Lane Roads Over Capacity	204 lane miles	196 lane miles	213 lane miles
4-Lane Roads Over Capacity	91 lane miles	82 lane miles	95 lane miles
TOTAL	**295 lane miles**	**278 lane miles**	**308 lane miles**
Difference Compared to No-Action (Baseline)		**17 fewer**	**13 more**

[6] A TAZ is a way of describing the urban area and the characteristics of the transportation system. A TAZ provides a method to study the urban area by dividing it into smaller geographic areas.

of McHenry and Will counties. The IL 83/US 45 with US 12 Alternative would improve travel times over a 65-percent smaller area in Lake and northern Cook counties.

- **Trips originating from the IL 60/I-94 area—**The IL 53 Freeway/Tollway Alternative improves travel times in much of Lake, all of McHenry, and portions of DuPage, Kane, Boone, and Kenosha counties. The IL 83/US 45 with US 12 Alternative would improve travel times in a similar area to the IL 53 Freeway/Tollway Alternative; however, it would worsen travel times in a geographical area of about the same size (i.e., DuPage, Will and southern Cook counties). This worsening over a sizeable area is due to maintaining I-94 as the only principal north-south route through the county, whereas the IL 53 Freeway/Tollway Alternative better distributes traffic to the regional system via the existing I-94 and the proposed IL 53 facility.
- **Trips destined for Kenosha County area—**The IL 53 Freeway/Tollway Alternative improves travel times in southern Lake and northern Cook counties and along the I-355 corridor in DuPage County. The IL 83/US 45 with US 12 Alternative would improve travel over a 19-percent smaller area in southern Lake and northern Cook counties, and along the I-94 corridor in eastern Cook County.

The analysis demonstrates that the IL 53 Freeway/Tollway Alternative generally improves regional travel to a greater extent than the IL 83/US 45 with US 12 Alternative. This is primarily due to the IL 53 alternative creating a more balanced regional network, and therefore a more balanced distribution of regional travel.

Regional System Continuity. The analysis of regional travel also considered how each alternative would improve continuity in the regional expressway system.

- The IL 83/US 45 with US 12 Alternative would improve travel flows along I-94, which presently carries a considerable portion of the 125,000 trips passing through Lake County. This alternative improves a major link in the existing expressway system; however, it provides no substantive remedy for continuity travel issues along the region's expressway system.
- The IL 53 Freeway/Tollway Alternative would more effectively address several travel continuity issues in the region, including extending the terminus of IL 53 at Lake Cook Road to a logical system connection with I-94 near Gurnee. The current terminus of IL 53 at Lake Cook Road requires all traffic (90,000 per day) to exit the expressway and use existing arterials to reach destinations throughout Lake County. The extension of IL 53 would complete a link in the regional

TABLE 3-14

Net Traffic Analysis Zones and Geographic Area Receiving a 5-Percent Travel Time Saving, Compared to Baseline

		Lake Cook/US 12	IL 132/I-94	IL 60/I-94	Kenosha
IL 53 Freeway/ Tollway	TAZs	309	1,316	525	470
	Area km^2 mi^2	4,217 1,628	5,444 2,102	4,481 1,730	1,987 767
IL 83/US 45 with US 12	TAZs	199	590	(567) *	547
	Area km^2 mi^2	3,797 1,466	1,893 731	329 127	1,619 625

* ( ) Denotes a negative difference of more TAZs with an increase in travel time.

expressway system that would accomplish several objectives:

- Elimination of the unconventional terminus of IL 53 at Lake Cook Road that results in severe traffic congestion.
- Provision of a logical system connection, and more direct access for travelers destined for locations in central Lake, western Cook, and DuPage and Will counties.
- Provision of a north-south link that responds to a specific travel demand need, as well as providing system redundancy to better manage regional and peak hour travel.

3.6.3.2 Improve North-South Travel Capacity and Efficiency

Systemwide. The need to improve north-south travel capacity and efficiency is measured as the number of uncongested north-south lane miles in Lake County. The number of "uncongested" lane miles for each build alternative was determined by identifying those routes with a Level of Service A, B, or C during the P.M. peak travel period in the year 2020. The results of the analysis indicate that the IL 53 Freeway/Tollway Alternative would result in nearly 70 more uncongested lane miles, and improve conditions by 12 percent, while the IL 83/US 45 with US 12 Alternative would result in about 40 more uncongested lane miles, and improve conditions by 7 percent when compared to the No-Action Alternative (Baseline) as summarized in Table 3-15.

Select Trips. The LCTIP also examined the effects of the alternatives on several north-south trips in the County. This analysis examined a western, central, and eastern north-south trips. The western trip was represented by a trip from Barrington to Volo (see Table 3-16). For this trip, the IL 53 Freeway/Tollway Alternative would provide a 14-percent travel time improvement over the No-Action Alternative (Baseline), while the IL 83/US 45 with US 12 Alternative would provide an 11-percent improvement. The central trip extended from Schaumburg to Grayslake. The IL 53 Freeway/Tollway Alternative would provide a sizable travel time improvement over the No-Action Alternative (Baseline) of 17 percent, while the IL 83/US 45 with US 12 Alternative would provide a 9-percent improvement. The analysis of the eastern trip, extending from Deerfield to Waukegan, showed different results. In this case, the IL 83/US 45 Alternative with US 12 would provide a

TABLE 3-15
Uncongested North-South Travel

Alternative	Uncongested Lane Miles	% Improvement Over No-Action Alternative (Baseline)
No Action (Baseline)	530	—
IL 53 Freeway/Tollway	596	12 %
IL 83/US 45 with US 12	568	7 %

TABLE 3-16
Percent Travel Time Savings Over the No-Action (Baseline) for Three North-South Trips

	Barrington to Volo	Schaumburg to Grayslake	Deerfield to Waukegan
IL 53 Freeway/Tollway	14%	17%	13%
IL 83/US 45 with US 12	11%	9%	24%

24 percent improvement in travel time over the No-Action Alternative (Baseline) compared to a 13-percent improvement for the IL 53 Freeway/Tollway Alternative. The travel time savings ranges from 9 to 24 percent with either alternative improving travel in each case. The IL 53 Freeway/Tollway Alternative provides greater benefits to the western and central parts of the county than does the IL 83/US 45 with US 12 Alternative. In eastern Lake County, the IL 83/US 45 with US 12 Alternative improves travel more, due to a concentration of roadway improvements along the IL 21 corridor and I-94.

3.6.3.3 Improve Safety

The LCTIP developed a quantitative approach for comparing the safety performance of the No-Action (Baseline) and the build alternatives (LCTIP 2000c). The safety assessment was based upon past research of factors that influence crash rates (i.e., congestion, facility type, and access considerations) and current crash trends in Lake County. The crash rate factors were combined with specific roadway data (i.e., geometrics and traffic volumes) to predict the number and types of crashes for various roadway types. Using the assembled data, the analysis estimated the expected crash rate for the project alternatives. The findings include:

- Despite an 8-percent higher VMT than the No-Action Alternative (Baseline), the IL 53 Freeway/Tollway Alternative is expected to reduce the overall crash rate by 7 percent.
- Despite a 5-percent higher VMT than the No-Action Alternative (Baseline), the IL 83/US 45 with US 12 Alternative is expected to reduce the crash rate by 1 percent.
- The LCTIP safety assessment is intended to be a relative comparison, rather than an absolute prediction of accident experience. The results indicate that the IL 53 Freeway/Tollway Alternative is attracting more travel to safer facilities, and is expected to have an overall crash rate that is better than other alternatives.

3.6.3.4 Improve Modal Connections

Both build alternatives have the capacity for improving modal connections. Each alternative would provide opportunities for improving modal connections at the origins and destinations of modal travel. Recommendations that would improve modal connections are:

- Improved parking at existing rail stations to accommodate the additional rail patrons that access the station by automobile.
- Transportation centers that provide improved automobile access, and improved linkages for bus-to-bus and bus-to-rail transfers.
- Improved bus service that provides enhanced service to rail stations, improved service between rail stations and employment centers, and improved service to other major transportation facilities (i.e., O'Hare International Airport).
- Improved information messaging at key locations (i.e., transportation centers) that convey information on transit schedules and mode transfers and traffic signal preemption giving priority to buses.
- Park-and-ride facilities at strategic locations that allow people to drop off their cars and transfer to a bus system, carpool, vanpool, or even a commuter train if nearby.
- Improved connection between existing and planned bicycle and pedestrian paths.

In summary, the IL 53 Freeway/Tollway Alternative would offer several opportunities along each of its corridors for improved modal connections. A new highway (IL 53 Freeway/Tollway Alternative) offers strategic locations (interchange locations) for park-and-ride facilities that represent natural collection points for carpooling, vanpooling, express/trunkline bus services, and shuttle bus services to major employers. The IL 53

Freeway/Tollway Alternative would also provide an opportunity for a new bicycle/pedestrian path along the facility with connections to existing paths via local roads.

The IL 83/US 45 with US 12 Alternative would offer a number of opportunities for improved modal connections, such as improved connection between existing and planned bicycle and pedestrian paths, linkages to existing and planned rail stations and transportation centers, and for accommodation of bus routes.

3.7 Summary

The LCTIP has implemented a structured, rigorous technical process for developing and evaluating a broad range of transportation alternatives. State-of-the art technical tools and innovative techniques were used to define the transportation problems and evaluate potential solutions in a study area that spans hundreds of miles of roadways, three counties, 70 communities and 500 square miles—to an equal level of detail. This effort has been supported by extensive input from area residents, interested groups, agencies, transportation providers and elected officials.

The avoidance or minimization of impacts to environmental resources was a key consideration early and throughout the planning process. The differences in impacts across the suite of initial alternatives were not distinguishing. As a result, the evaluation process focused upon travel performance measures, which were closely linked to the project's purpose and need. On the basis of this evaluation, the IL 53 Freeway/Tollway Alternative and IL 83/US 45 with US 12 alternative were selected as finalists. The finalists were then further refined, including the development of separate population, employment and travel demand forecasts for each finalist and the No-Action Alternative (Baseline). These forecasts were used to more rigorously assess the alternative's travel performance, which are summarized in Table 3-17. In addition to the roadway elements, a comprehensive package of supporting improvements was developed, including upgrades to rail and bus service, bike and pedestrian facilities, as well as travel demand management and transportation system management strategies.

The environmental and societal impacts of the finalist build alternatives and the No-Action Alternative (Baseline) are comparatively evaluated in Section 4, *Environmental Consequences*, and a complete summary of the environmental consequences associated with the alternatives is provided at the end of the section.

TABLE 3-17
Travel Performance Summary for Finalist Build Alternatives

Alternative	Regional		Local		North-South Uncongested Lane Miles	Safety
	Geographic Area	System Continuity	Local Trips	County Routes		
IL 53 Freeway/Tollway	✓	✓		✓	✓	✓
IL 83/US 45 with US 12			✓			
A "✓" denotes the best performance by category.						